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A SERIES OF CASES OF CALCULOUS OBSTRUCTION OF THE COMMON BILE DUCT, TREATED BY INCISION AND REMOVAL OF THE CALCULI.

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(*Reprinted from the Montreal Medical Journal, October, 1898.*)

A SERIES OF CASES OF CALCULOUS OBSTRUCTION OF THE COMMON BILE DUCT, TREATED BY INCISION AND REMOVAL OF THE CALCULI.[1]

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It is safe to say that in no department of surgery has greater progress been made in recent years than in the treatment of gall-stone disease by operation upon the gall-bladder and ducts. Lives are now saved and health restored by operations which are followed by a very low death rate, and which have this advantage over many other valuable surgical procedures, that they restore the health completely and leave the patient free from deformity or loss of function. The first successful cholecystotomy was done by Mr. Lawson Tait, in August, 1879, and the first attempt to remove stones from the common duct was made, (also by Mr. Tait), by crushing in July, 1884.[2] Later Mr. Knowsley Thornton operated by breaking up the stones with a needle passed through the walls of the duct (" needling"), and forcing the fragments out into the duodenum. The first successful choledochotomy was performed by Curvoisier in January, 1891.[3] To-day cholecystostomy is a common operation, frequently performed and generally with the most satisfactory results, and in ordinary cases the procedure is almost devoid of danger. Incision of the common duct for the removal of calculi, which has now almost entirely superseded the cruder operation of " crushing" and " needling," is, of course, a much more difficult and serious operation, and is generally called for

[1] Read at the meeting of the Canadian Medical Association, Quebec, August, 1898.

[2] Lancet, Vol. II., 1885.

[3] A. W. Mayo Robson Hunterian Lectures, 1897.

in conditions of the patient which are much more unfavourable for operation. Nevertheless, the mortality rate is low, and the results in the successful cases are brilliant. I have purposely refrained from using in the title of this communication the uncouth and cumbrous terms by which these operations are described, (choledochotomy, choledocholithotomy, choledochoduodenotomy, choledochoduodenolithotomy, etc.), as no one of them could be properly used for all of the six cases which form the subject matter of the paper. Of these six cases five were females, each of whom had borne a large number of children. The ages of the patients ranged from 33 to 61 years. In two there was but a solitary stone, in three there were stones in the gall-bladder, as well as in the common duct, in four, there was obliteration of the cystic duct and a contracted gall-bladder, which contained no bile, and in two, a large stone was impacted in the ampulla of the duct within the duodenum, (diverticulum of Vater), and was removed through an incision in the duodenum (choledochoduodenotomy). There was but one death in the six cases, from pneumonia on the sixth day after operation, and one patient was submitted to a second operation upon the duct, five and one-half months after the first operation.

CASE I.—E. B., a gentleman, æt. 52, had his first attack of pain in the right side of the abdomen while travelling by rail in the summer of 1892. It was severe, lasted all evening and was followed by jaundice, which passed off in a day or two. Three similar attacks followed, one in three months, another in the winter of 1893, and the third in February, 1894, with intervals of good health. On the 25th of January, 1895, the fifth attack began, more insidiously than any of the previous ones. From this time there were frequent attacks with persistent and steadily increasing jaundice, drowsiness, anorexia, itching of the skin, and loss of weight, from 225 lbs. to 140 lbs. in eleven months and a half,—(from January 25th, 1895, till he came under my observation, January, 13th, 1896). Operation was performed on the 14th of January, 1896. There was much adhesion of the colon, duodenum and omentum to the liver. The gall-bladder was contracted and empty. A stone, about the size of a playing marble, was discovered impacted in the ampulla of the duct, within the duodenum. It was removed through an incision made along the line of the duct and obliquely across the duodenum at its posterior border—choledochoduodenotomy. The wound in the duodenum was closed by fine silk sutures, two or three carried through all the coats of the bowel, and then a double row of Lembert sutures. A rubber drainage tube was carried down to the bottom of the cavity and surrounded by iodoform gauze packing, There was no escape of bile or duodenal contents,

and the patient made an excellent recovery. Within a few weeks he had regained the 80 lbs. which he had lost in the year preceding the operation, and he is still, I believe, in the enjoyment of perfect health.

CASE II.—Mrs. S., æt. 56, the mother of a large family, was admitted to the Royal Victoria Hospital on the 16th February, 1897, deeply jaundiced and complaining of pain and tenderness in the epigastrium. A long series of attacks of crampy pain in the epigastrium (evidently biliary colic) had begun about twenty years prior to her admission to hospital and had continued for ten years with considerable frequency and steadily increasing severity. At the end of ten years a large, painful, tender tumour developed in the epigastrium, and she was confined to bed with chills, flushes, pain and weakness, (acute cholecystitis?) At the end of six months, the tumour began to diminish in size and gradually disappeared altogether, and at the same time she became deeply jaundiced. The jaundice lasted about six months. She remained fairly well then for four or five years, with the exception of frequent "weak turns." Then she had typhoid fever, after which she remained well again until one year before coming under observation, when the pain returned with swelling of the limbs, high-coloured urine, and general malaise, which lasted six weeks. Two months before admission, she was again seized with pain in the epigastrium. The attacks were frequent and severe, the urine became high-coloured and jaundice developed. Two weeks before admission the jaundice became very marked and steadily increased. She had also been losing flesh rapidly during the last two months. On admission there was extreme jaundice, with bile stained urine and colourless stools. The liver was not enlarged but there was a tender point midway between the xiphoid cartilage and the umbilicus and just to the right of the middle line. There was great prostration which was attributed to cholæmia. This patient was operated upon on the 23rd of February. On opening the abdomen there was much adhesion of the omentum to the lower surface of the liver. The gall-bladder was contracted and contained twelve small facetted stones which were removed with the finger through an incision made into the least prominent part. There was no bile. Two smallish stones were removed in fragments through an incision on the dilated common duct and a large one, about the size of a marble, which lay in the ampulla of the duct, within the duodenum was pushed backwards and removed through the same incision. The aggregate weight of the fifteen stones was 3.1 grammes. The incision in the common duct was closed by sutures as in the previous case, but it was found impossible to either completely close the wound in the gall-bladder or

bring it up to the parietal peritoneum. There was considerable escape of bile from the incision in the duct during the operation owing to the difficulty of dislodging the large stone from the ampulla of the duct. The bile was carefully mopped out and a large drainage tube carried down to the border of the cavity, and well-packed round with iodoform gauze. There was a moderate escape of bile from the tube, and the patient seemed to do fairly well for four days, when she developed a right-sided pneumonia and died on the first of March, six days after operation. There was no autopsy, but during the six days following operation there was neither abdominal pain nor distension nor any symptom to indicate local disturbance. This patient was cholæmic, weak and miserable at the time of operation and took ether badly, having the air passages full of mucus throughout, and to this I am inclined to attribute the pneumonia which was the cause of death.

CASE III.—Mrs. C., æt. 47, the mother of 11 children, the youngest six years of age, was admitted to the Royal Victoria Hospital on the 13th of August, 1897, deeply jaundiced and complaining of pain just to the right of the epigastrium. She had had her first attack of biliary colic in 1881, and from that date to 1894, she had had an attack about every two years. In 1894, she had a very severe attack, the pain lasting 12 days. In the next two years she had an attack each year. From the first, each attack was accompanied and followed by jaundice. From May, 1897, she had had several attacks and the jaundice had never entirely disappeared. During all this time she had colorless stools and very dark urine. The last attack began on the 26th of July, and lasted three days. From that time until the date of operation, August 17th, the jaundice had steadily increased. She had lost much flesh, and the rounded border of the liver could be distinctly felt through the flaccid abdominal wall. She was very deeply jaundiced and had a systolic apex heart murmur. The other organs were normal. At the operation, there were few adhesions, the gall-bladder was shrunken and empty, and a large stone was readily detected in the common duct about half an inch above the duodenum. It was fixed in this situation, or at least was not easily movable. An incision was made over the stone, which was removed, and the incision closed by fine silk sutures. Five sutures were inserted through all the coats and a double row of Lembert sutures was applied over this again. The stone weighed 4 grammes. A drainage tube was inserted down to the bottom of the cavity and packed around with iodoform gauze. There was no escape of bile and recovery was uneventful. A bile stained discharge appeared in the dressing, but I believe it to

have been simply bile stained serum. This patient was discharged on the 1st of October, perfectly well.

CASE IV.—Mrs. C., æt. 61, a stout woman, the mother of 14 children, was admitted to the Royal Victoria Hospital on the 13th of October, 1897, deeply jaundiced, and with two large carbuncles on the right side of the abdomen, on a line with the umbilicus. Her symptoms had begun in the winter of 1894, after a fall, in which she struck her right side against the edge of a barn door. Periodic attacks of pain and tenderness in the right epigastrium occurred about twice in the year, but they were not accompanied by jaundice, until August 10th, 1897, when the last attack began. This was attended with severe and continued pain, constant vomiting and a sense of fulness about the stomach, and jaundice, which grew gradually deeper and deeper until she came to hospital. The carbuncles were first attended to, on the 14th of October, and on the 4th of November, the abdomen was opened. The liver was enlarged, the gall-bladder was shrunken and contained five calculi, but no bile. The cystic duct was obliterated and the common duct was dilated and contained a fairly large stone which could be moved back and forth along the duct. The stone was removed through an incision in the middle third of the duct and the incision sutured in the usual way. This stone was facetted, as were the five others removed from the shrunken gall-bladder. The aggregate weight of the stones was 4.7 grammes. The cavity was drained by a tube passed down to the incision in the common duct, and surrounded by iodoform gauze packing. This patient made an uneventful recovery and was discharged on the 20th of December, with the wound perfectly healed.

[Within the past ten days I have heard of the patient through her son. His report is as follows: For some time after going home she remained quite well but in January she began to complain of pain in the abdomen. On the 7th of May, she became definitely insane with delusions on the subject of religion, etc. At no time has she had any jaundice, her color is good, and the stools and urine are normal.]

CASE V.—Mrs. K., æt. 49, the mother of 12 children, the youngest born 14 years ago, was admitted to the Royal Victoria Hospital on the 5th of February, 1898, with a history of two month's illness. On the 8th of December, 1897, she was seized with moderately severe pain in the epigastrium, which prevented her from straightening herself up. This was soon followed by jaundice. The jaundice persisted and the attacks recurred about twice a week until she came to hospital. She had lost a good deal of flesh and had been chilly and feverish. On admission she was deeply jaundiced; the stools were colorless and

the urine very dark. Operation was performed on the 10th of February. The duodenum was firmly adherent to the contracted gall-bladder and was wounded in separating them. The wound was closed by silk sutures—first through the whole thickness of the bowel and then a double row of Lembert sutures. A large stone weighing 3.25 grammes was found in the common duct which was much dilated. It was freely movable in the duct and was removed through a longitudinal incision which was sutured with fine silk in the usual way. A drainage tube was inserted and surrounded by iodoform gauze packing. The dressings next morning showed evidence of the escape of bile, and again on the following morning. From this time there was more or less escape of bile into the dressing for four or five weeks. In the meantime the jaundice had entirely disappeared and the stools and urine were normal in color and appearance, and the wound was almost completely healed. On the 24th of April, it was noticed that the skin was slightly yellow again. On the 6th of May, she had a severe attack of pain with increase in the jaundice. From this time on she developed symptoms of obstruction in the common duct and the abdomen was re-opened on the 21st of July, by an incision about an inch inside of the previous one. The duct was easily reached, although the duodenum was again wounded in separating it from the under surface of the liver. The wound was immediately closed by sutures as before. A movable stone was found in the common duct and removed through a longitudinal incision, which was closed by sutures of fine silk as in the previous operation. This stone weighed .5 grammes. There was nothing in the appearance of the duct to indicate that it had been previously opened or otherwise interfered with. The cavity was drained and packed as in the previous operation. There was some escape of bile the following morning. This soon ceased, however, and in four days the urine and stools were normal and the yellowness had almost entirely disappeared from the skin and conjunctivæ. This patient continues to make excellent progress towards recovery. This second operation was much easier than the first, and except at the lowermost part of the wound the operation field was entirely cut off from the general peritoneal cavity by adhesions.

CASE VI.—Mrs. B., æt. 33, the mother of six children, was admitted to the Royal Victoria Hospital on the 6th of May, 1898, suffering from jaundice and recurring attacks of pain in the right hypochrondrium. Her first symptoms, of this kind, had occurred two years previously. In three months more she had a series of mild attacks and then remained well for a year, when she had another severe

attack. This was in June, 1897. She was again free from attacks of pain until four weeks prior to admission, when she began to have a series of attacks accompanied by jaundice which varied in intensity, from time to time, but never disappeared. The temperature ranged from 98° F. to 101° F., the liver was slightly enlarged and its lower border was palpable, and there was a trace of albumen in the urine. Operation was performed on the 12th of May. On opening the abdomen the colon and stomach were adherent to the liver, but the gall-bladder and ducts were exposed without much difficulty. The gall-bladder was distended and tense and the common duct much dilated. A stone was found firmly impacted in the ampulla, within the duodenum. It was removed through an incision over the end of the duct into the duodenum, which was immediately closed by silk sutures, first through all the tissues, and then a double row of Lembert sutures. This stone was facetted. The base of the distended gall-bladder was next aspirated and three ounces of greyish thick pus withdrawn which gave sterile cultures. Six facetted stones were removed from the gall-bladder and one from the cystic duct—eight in all, weighing 7.3 grammes. The cystic duct was obliterated beyond the impacted stone. The gall-bladder was attached to the peritoneum and a drainage tube inserted into it. A strip of iodoform gauze was passed down along the under surface of the gall-bladder and cystic duct, to the line of incision in the duodenum, at the end of the common duct. The remainder of the abdominal wound was closed. The patient made an excellent recovery and was discharged quite well on the 5th of July.

In estimating the value of a surgical procedure, we have to consider: (1) The conditions which call for operation and the prognosis in these conditions, under other methods of treatment, or no treatment at all. (2) The gravity of the operative procedure in itself, and (3) the results which we may reasonably expect to attain by operation?

(1) *The conditions calling for operation.*—In jaundice due to mechanical obstruction by a stone, or by several stones in the common bile duct, there is but one ground for hope, outside of operation, and that is the expulsion of the stone by natural methods, or its escape into a neighbouring viscus, (stomach or colon), by adhesion and ulceration. Medicinal treatment is useless and nothing short of direct interference can avail to remove the stones. If the obstruction persists, cholæmia sooner or later proves fatal, (directly or indirectly), or perforation and escape of contents into the general peritoneal cavity occurs and sets up a fatal peritonitis, or cancer develops as a result of the long continued irritation of the passages and carries off the patient. The only question then would seem to be, how long one should wait in

obstructive jaundice before resorting to operation? This is a most difficult question to decide, because on the one hand we cannot fix any period at which we can say that the possibilities of nature have been exhausted, and on the other, it is obviously undesirable to allow patients to suffer unnecessarily for weeks or months before affording the relief which must sooner or later be given. In general terms, it may be said that no rule can be laid down and each case must be taken upon its own merits. On this point I have had, in my own experience, one very instructive demonstration.

[A young woman, aged 23 years, had her first attack of biliary colic on the 1st of April, 1897. Repeated attacks followed, and on the 22nd of June she became jaundiced. The jaundice persisted and attacks of pain, gradually increasing in severity, occurred at short intervals until the day after her admission to the hospital (August 19th, 1897), when they ceased altogether. I operated on the 25th August, only to find distinctive evidence that the stone had passed through the duct.]

(2) *The gravity of the operation.*—The operation, although often difficult, is not a serious one, as is shown by statistics, and no doubt the death rate, in this as in all the newer operative procedures, will be much reduced in the future. The number of choledochotomies heretofore reported is too limited to furnish statistics of any special value, but Mr. A. W. Mayo Robson[1] gives the death rate, as calculated from three series of collected cases, as well as from his own individual cases and those of two or three other surgeons, as ranging from 16 per cent. to 37.8 per cent. In my own cases. (seven operations upon six patients), there was only one death, from pneumonia on the sixth day after operation. The dangers are, shock, from undue prolongation of the operation, peritoneal infection by the contents of the bile passages and hæmorrhage. Wounds of viscera in separating adhesions are accidents common to all abdominal operations. It is believed by many surgeons that long continued jaundice predisposes to hæmorrhage by altering the composition of the blood. My limited personal experience in these cases and others in which I have removed the stones by other means than through incision of the duct, has not confirmed this observation.

Method of operating.—The methods of different operators differ only in unimportant details. My operations have been carried out in the following manner: A vertical incision is made in the abdominal wall from the costal margin over the centre of the rectus muscle, down to about the umbilicus. The fibres of the muscle are separated and the peritoneum opened. Through this wound the parts are explored and the conditions determined as far as possible. A second incision is then made from the upper end of the first one along the costal

[1] Diseases of the gall-bladder and bile duct.

margin towards the ensiform cartilage, for one inch, or perhaps two inches. There is generally much adhesion of omentum, colon, duodenum or stomach to the under surface of the liver, and the separation of these adhesions is in most cases the most important and difficult part of the operation. The large thin-walled vessels of the omentum are easly torn and may give rise to very troublesome hæmorrhage and greatly prolong and complicate the operation. It is at this point, too, that the hollow viscera are likely to be wounded. When these adhesions are separated there is no difficulty in discovering the dilated common bile duct at the bottom of the cavity, extending obliquely inwards from the gall-bladder, (which is usually shrunken and contracted), to the head of the pancreas. It is, of course, indistinguishably bound up in cellular tissue with the portal vein and hepatic artery,—the whole appearing as a rounded rope-like mass, usually about two inches in length. The field of operation is now limited to a cavity, bounded internally by the stomach and duodenum, below by the colon, above by the liver and externally by the right lobe of the liver and the parietes of the abdomen; and with a few sterilized gauze pads the general peritoneal cavity is completely cut off. With the first two fingers of the left hand, under the rope-like mass above referred to, and the thumb apposed anteriorly the duct, which lies in front, can be explored from end to end and any stone easily detected. The stone is then made to project against the anterior wall of the duct by the fiugers beneath, and the thumb compresses the duct on its proximal side to prevent the gush of bile which follows the relief of the obstruction. A longitudinal incision is made in the duct and the stone or stones evacuated. I generally retain the fingers and thumb in this position until I have passed three or four, or more, silk sutures through the edges of the incision, which are tied by my assistant. I can then relax my hold upon the duct and insert a number of Lembert sutures, carefully approximating the peritoneal surfaces. In this way neither bile nor blood escapes. A drainage tube is passed down to the bottom of the cavity near the line of suture and surrounded by a tubular packing of iodoform gauze to ensure the safety of the peritoneal cavity in case of the sutures in the duct giving way. It is sometimes said that it is unnecessary to close the wound in the duct. but the great gush of pent up bile which always escapes though the incision, if allowed to do so, leads me to think that closure of the wound is, at least, a wise precaution. I also look upon provision for drainage as a wise precaution—if not a necessary one, for in spite of the greatest care there may be some escape of bile from the wound in the duct, which may, as pointed out by

Riedel, be temporarily obstructed by blood clot after operation. In three of my cases there was some escape of bile a few days after operation, and I am of the opinion that to depend upon the suture of the duct with so much confidence as to close the abdominal wound completely would surely lead, sometimes at least, to disaster.

Finally, the vertical portion of the abdominal wound is closed by sutures and the drainage tube brought out through the obliquely transverse portion.